

WATER POLLUTION INCIDENTS IN ENGLAND AND WALES - 1991



Report of the
National Rivers Authority

September 1992



NRA

National Rivers Authority

Water Quality Series No.9

National Rivers Authority

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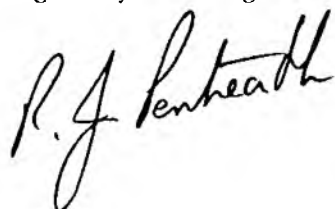
WATER POLLUTION INCIDENTS IN ENGLAND AND WALES 1991
(NRA Water Quality Series No. 9)

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	Total Convictions should read	227
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	Total Convictions for all Regions should read	552

PREFACE

In order to improve the quality of surface and groundwater, long-term planning is essential, both with regard to the water quality objectives which are being sought, and the means of achieving them. Large capital investment programmes by industry in general are in hand. It is therefore equally essential to ensure that sufficient attention is paid to reducing the risks of causing pollution through a miscellany of incidents, any one of which could reduce substantially the value of the progress made. In order to put greater effort into reducing such risks at source does, however, require adequate information on the number and nature of such incidents, and on the damage which they cause. Thus the compilation of annual information, as produced in this second NRA report on the subject, needs to be seen not simply as a record of illegal and unfortunate events, but as a means of being more effective in reducing the occurrence of such incidents in the future. And in order to do so, it is essential to base any action taken on accurate and validated information: for this reason, therefore, the data discussed in this report are those which have been substantiated, although the overall number of incidents reported regionally are also given for comparison with previous years.

A handwritten signature in dark ink, appearing to read 'R. J. Pentreath', written in a cursive style.

DR R J PENTREATH
Chief Scientist

ACKNOWLEDGEMENTS

The material in this report was prepared by Dr J.A. Vale who would like to thank all the Regional and Head Office NRA staff who compiled the data and contributed to the report.

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SUMMARY

This report is the second annual analysis of pollution incident statistics in England and Wales prepared by the NRA. Summary statistics are provided on substantiated pollution incidents that occurred in 1991, including commentary on court actions that took place in respect of these pollution events.

A total of 29,372 pollution incidents were reported to the NRA in 1991, of which 22,469 (76%) were subsequently substantiated; 386 (1.7%) of the latter were classified as 'major' under the NRA incident classification system. Of those substantiated incidents classified by pollution source, sewage related and oil pollution incidents were the most common (28.3% and 23.5% respectively), with those from farms and industry accounting for around 13% each. Nevertheless, the number of oil pollution incidents has decreased slightly whilst those from sewage and water industry related sources have continued to increase since 1990. A total of 347 incidents that occurred in 1991 were successfully prosecuted by the NRA, and a further 119 incidents were still to be brought to court as of the 1st April 1992.

1 INTRODUCTION

1.1 BACKGROUND

This report is the second annual analysis of pollution incident statistics for England and Wales issued by the NRA; it details the substantiated pollution incidents that occurred in the calendar year 1991.

1.2 DEFINITIONS

The NRA uses a common pollution incident classification system throughout its ten regions. This defines three categories in terms of the severity of their impact: categories 1 (major), 2 (significant), and 3 (minor). Appendix A details the criteria upon which these categories are based. In addition, the criteria formerly jointly agreed by the NRA and The Ministry of Agriculture, Fisheries and Food (MAFF) to define a serious incident are utilised for comparative purposes.

Pollution sources are categorised into five basic types: farm, industrial, oil, sewage and water industry, and 'other' sources. The 'oil' category does not include oils from farm or industrial premises because these are included in those categories. Farm pollution incidents are further broken down by source according to the definitions used in earlier reports on pollution from farm wastes. The 'other' category includes a wide variety of sources including road traffic accidents, domestic spillages, illegal dumping of wastes, leachate problems and so on.

In contrast to previous years' reports, only substantiated pollution incidents are examined in detail, although records are kept of all the different incidents which are reported; every attempt is made by NRA staff to substantiate those which are reported.

2 ANALYSIS OF INCIDENTS

2.1 ALL INCIDENTS

2.1.1 Reported Incidents

A total of 29372 pollution incidents were reported to the NRA during the 1991 calendar year; this is a slight increase relative to 1990. A large proportion of reported incidents (23%) was recorded as being due to sewage or water industry related causes, 20% to oil, and around 11% each to farm and industrial sources; many of the remainder of incidents reported (35%), however, were not immediately characterised or no pollution was found. This category of incidents includes a wide variety of other sources such as road traffic accidents, domestic spillages, illegal dumping of wastes, and leachate problems. Every effort is made to substantiate the reports received from the public, to filter out multiple reports of the same incident, and to identify the cause and magnitude of effect. In 1991, 22469 pollution incidents (76% of those reported) were substantiated as having occurred, which was an increase of 8% over those substantiated in 1990.

For the sake of continuity with reports prepared prior to the NRA's formation, and with last year's report, both reported and substantiated incidents for 1990 and 1991 are given in Figures 1 and 2. The former indicates the trend since 1981 in total, and the latter the trend since 1981 by Region. The remainder of the report, however, concentrates on an analysis of only those incidents which were substantiated.

2.1.2 Regional Distribution

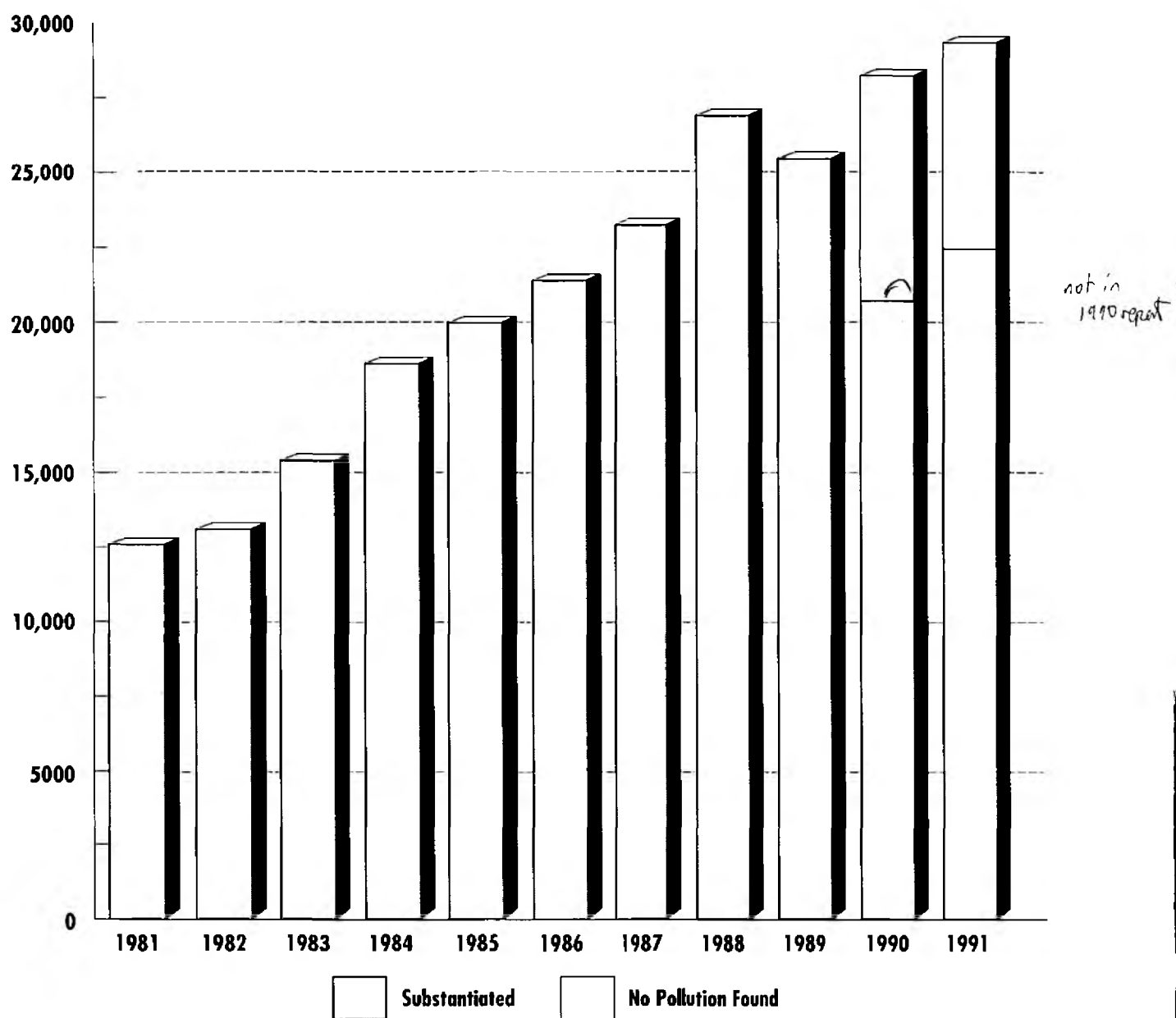
Of the 22469 substantiated pollution incidents in England and Wales in 1991, the largest proportion (19.4%) occurred in the Severn Trent Region and the smallest (4.8%) in Wessex (Figure 3). This distribution does not, however, necessarily indicate the relative effect which pollution incidents can have upon the quality of waters across the country; the environmental impact depends on both the nature and severity of the incidents.

2.1.3 Distribution by Category

Table 1 shows the Regional distribution of the 22469 substantiated pollution incidents by source category. Sewage and other water industry related incidents accounted for 28.3% of the total number, with oil related incidents comprising 23.5%, and farm and industrial incidents each accounting for around 13%; some 23% of incidents fell outside this classification (Figure 4a).

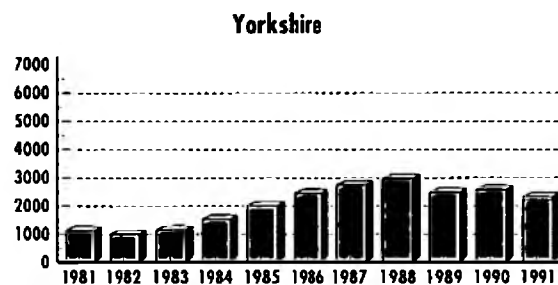
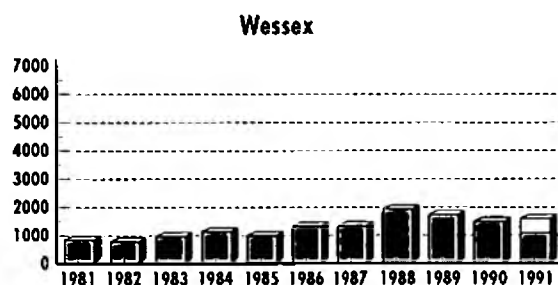
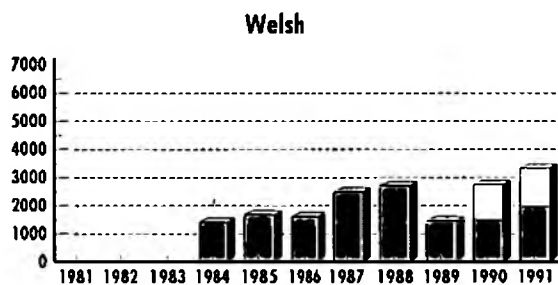
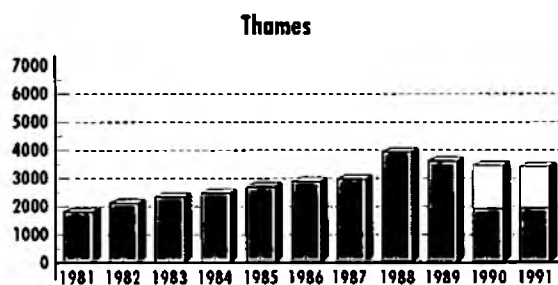
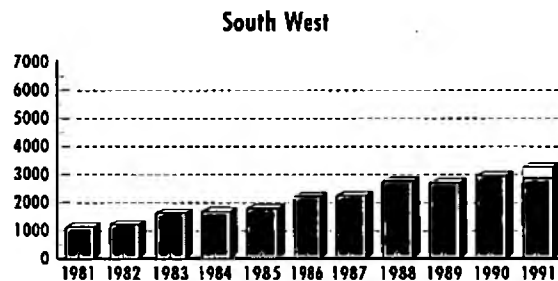
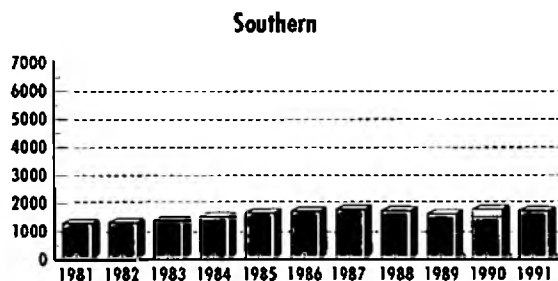
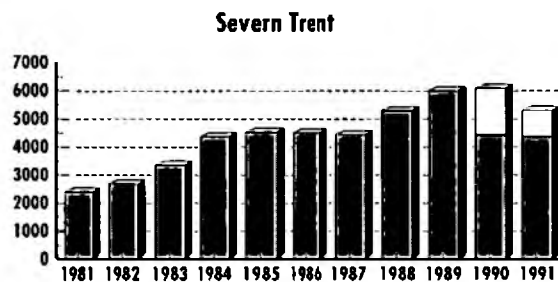
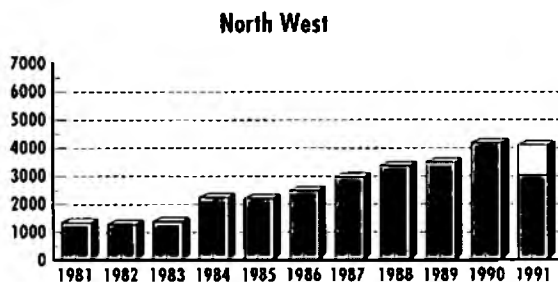
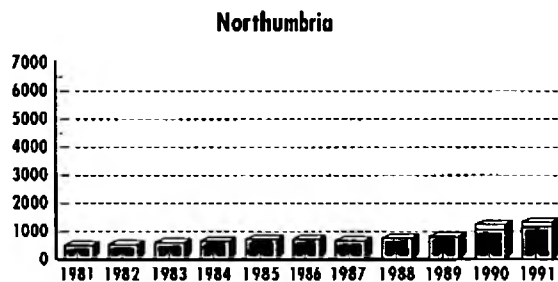
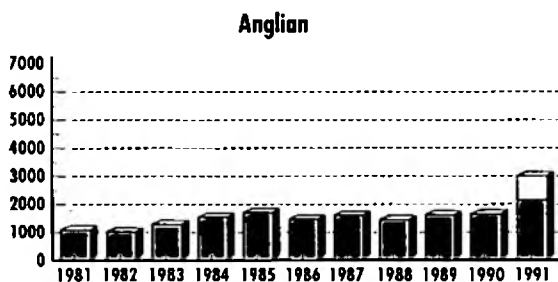
There are marked differences in the distribution and relative significance of the different types of pollution incidents by NRA Region and these are discussed in detail in the rest of this chapter.

Figure 1 - Total number of pollution incidents in England and Wales, 1981 - 1991



(Assumes that No. of incidents in the Welsh Water Authority 1981 - 3 account for the same percentage of national incidents 1984 - 1988)

Figure 2 - Total number of pollution incidents reported by NRA Region, 1981-1991



(Data for 1981-1988 from Department of Environment, 1989)

Figure 3 - Total number of substantiated pollution incidents by NRA Region, 1991

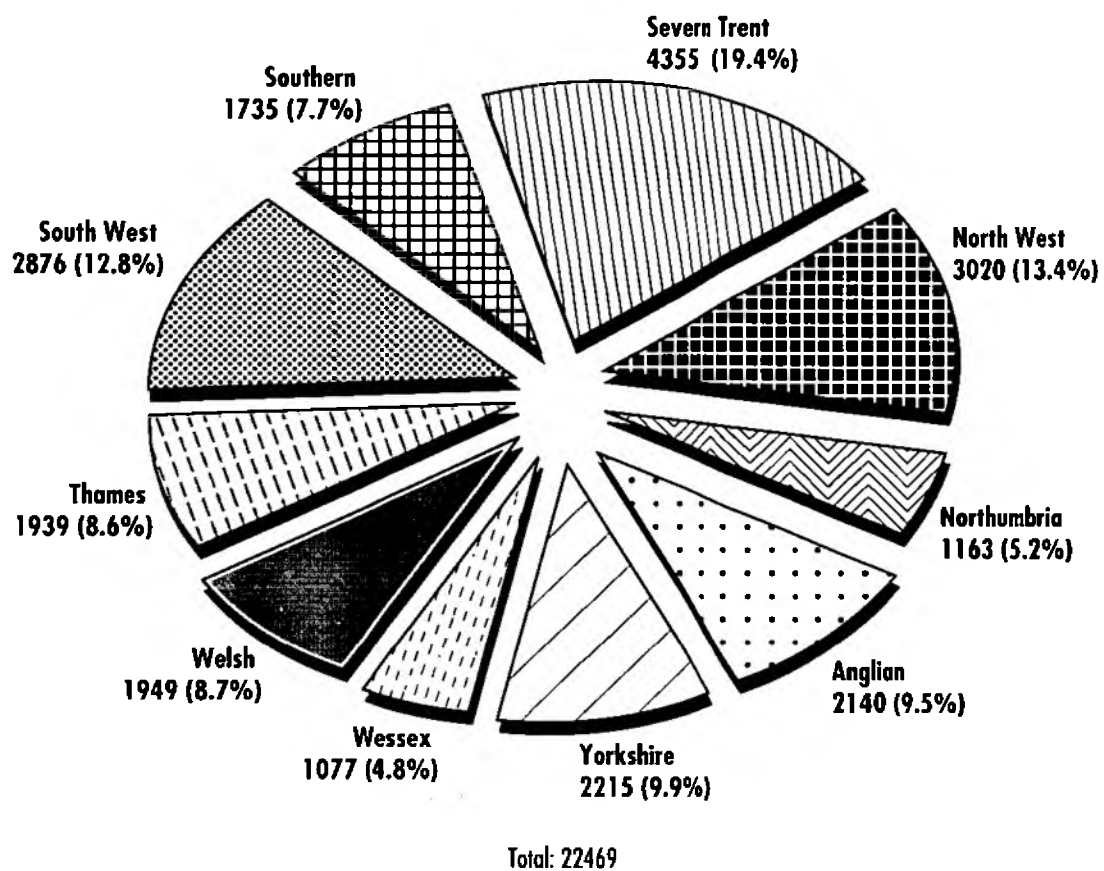
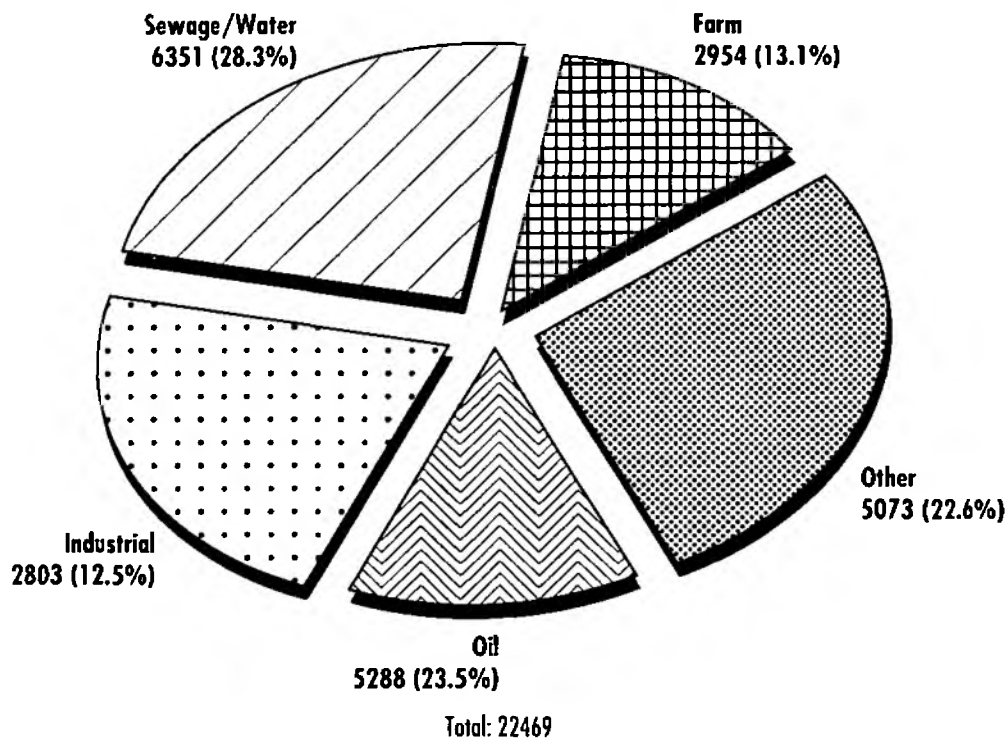


Figure 4 - Total number of substantiated pollution incidents by category, 1991

a) Total Number of Incidents



b) Major Incidents only

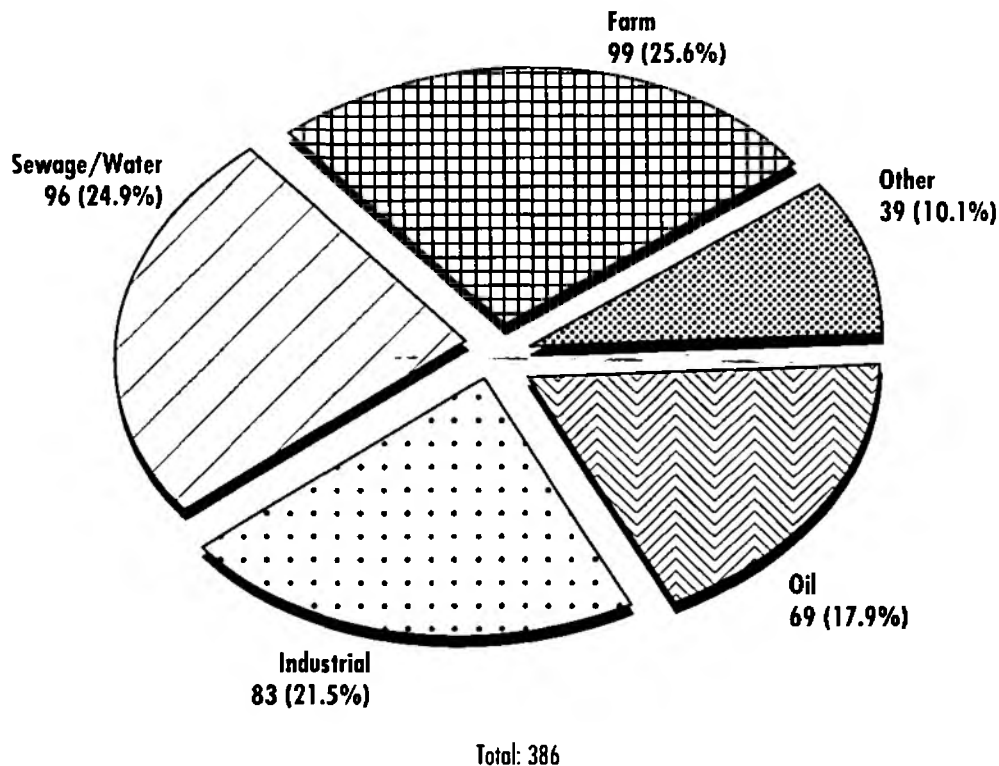


Table 1 - Total number of substantiated pollution incidents in 1991 by pollution source category

NRA Region	Farm	Industrial	Oil	Sewage & Water	Other	Total	Percent
Anglian	212	194	775	570	389	2140	9.5
Northumbria	79	123	228	486	247	1163	5.2
North West	469	336	571	986	658	3020	13.4
Severn Trent	402	608	1194	1329	822	4355	19.4
Southern	93	168	536	376	562	1735	7.7
South West	718	345	375	714	724	2876	12.8
Thames	78	211	851	416	383	1939	8.6
Welsh	421	428	103	525	472	1949	8.7
Wessex	218	67	359	215	218	1077	4.8
Yorkshire	264	323	296	734	598	2215	9.9
TOTAL	2954	2803	5288	6351	5073	22469	100.0
Percent	13.1	12.5	23.5	28.3	22.6	100	

2.1.4 Major Incidents

Of the 22469 pollution incidents that were substantiated by the NRA in 1991, 386 (1.7%) were 'major' incidents. This represents a decrease of 41% compared with the number reported in 1990 (NRA, 1992) and is, hopefully, an encouraging indication of the effective pollution prevention and control measures that are being pursued by the NRA. As in 1990 the largest proportion of 'major' pollution incidents emanated from farms (25.6%)(Figure 4b), but the number recorded for 1991 has decreased by 59% relative to 1990. The sewage and other water industry sources accounted for 25% (27% decrease), industry for 21.5% (24% decrease), oil for 18% (21% decrease) and 'other' for 10% (58% decrease). The Regional distribution of 'major' pollution incidents for each source category is shown in Table 2.

The greatest proportion of Category 1 pollution events was recorded in Severn Trent Region (32%) and indeed over 80% of such incidents occurred in only four Regions (Severn Trent, Yorkshire, North West and South West). This is very similar to the pattern shown in 1990 where three Regions contributed over 70% of the total, but this year Yorkshire Region has shown an increase (78%) in the number of category 1 pollution incidents recorded whereas those in South West Region decreased by 64%. The remaining Regions contributed between 1.8% (Southern) and 4.7% (Northumbria) of the total number of Category 1 incidents.

Table 2 - Total number of category 1 (Major) substantiated pollution incidents by pollution source category, 1990 and 1991

NRA Region	Farm		Industrial		Oil		Sewage & Water		Other		Total		Percent	
	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991
Anglian	36	3	1	4	0	1	0	1	2	2	39	11	5.9	2.9
Northumbria	5	5	7	2	5	4	4	6	5	1	28	18	4.3	4.7
North West	55	10	41	11	14	11	34	17	36	7	180	56	27.4	14.5
Severn Trent	46	27	20	35	46	30	32	23	4	7	148	122	22.5	31.6
Southern	2	3	5	2	5	1	4	0	1	1	17	7	2.6	1.8
South West	71	25	13	4	3	6	33	6	15	7	135	48	20.5	12.4
Thames	0	2	7	1	4	6	4	1	7	1	22	11	3.3	2.8
Welsh	3	4	4	4	4	1	4	4	10	2	25	15	3.8	3.9
Wessex	4	3	1	1	0	3	3	0	6	2	14	9	2.1	2.3
Yorkshire	17	17	10	19	6	6	13	38	4	9	50	89	7.6	23.1
TOTAL	239	99	109	83	87	69	131	96	92	39	658	386	100.0	100.0
Percent	36.3	25.6	16.6	21.5	13.2	17.9	19.9	24.9	14.0	10.1	100	100		

2.1.5 Regional Comparison by River Length

The physical and demographic characteristics of the ten NRA Regions vary considerably. Anglian Region comprises 17.8% of the total area of England and Wales and contains 10.5% of the population, whereas Northumbria comprises only 6.1% of the total area and 5.2% of the population (NRA 1991). The greatest population density is in the Thames Region with the most sparse being in South West Region. Pollution incident statistics are also dependent upon public observation and their quality is influenced by factors such as the population density, the visibility of the pollution, and public awareness and response. There are considerable differences in terrain as well as land use practices between the Regions, and thus it is difficult to make meaningful comparisons of the numbers of pollution events that occur within Regions. Further, there are differences in the degrees to which the former Water Authorities included smaller streams within their classified lengths. Nevertheless, because rivers are the prime recipients of pollutants, it is interesting to use the length of classified water in each Region in order to show the density of incidents arising per km of river length. This is shown in Figure 5, which gives a breakdown of incidents per km over the last decade, as a national total and by pollution source category. The figures for 1981 to 1991 are shown as the number of reported incidents whilst those given for 1991 are substantiated incidents.

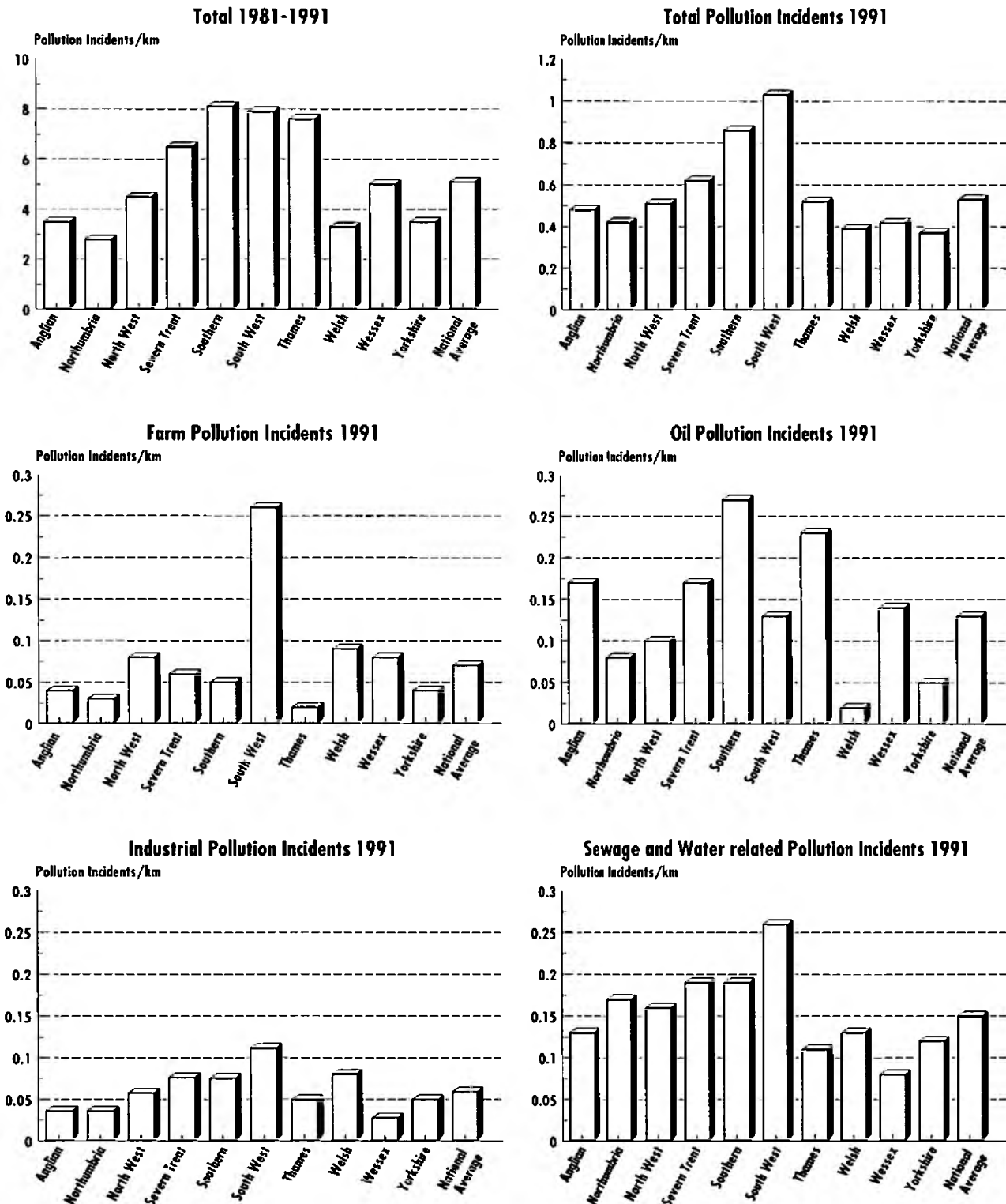
Over the period 1981 to 1991 Southern, South West and Thames Regions have consistently recorded a higher proportion of incidents per km, with Northumbria, Welsh and Yorkshire Regions recording the lowest proportions. In 1991 South West and Southern Regions, again, recorded the largest number of pollution incidents per km of controlled water with Welsh and Yorkshire Regions showing the least.

The number of farm pollution incidents in 1991 per km clearly shows the predominance and importance of pollution from this source type in the South West Region, with over 3 times the number of incidents per km compared with North West and over 12 times the number in Thames. The reasons for this conspicuous difference between South West and the other NRA Regions may not be immediately apparent because the South West makes up a relatively small proportion (7%) of agricultural land use in England and Wales with Thames making up 6% (NRA 1992). The greatest proportion of agricultural land is in Anglian Region which comprises 19% of the national total. However, a more detailed breakdown of the information indicates that the nature of the farming

practice is the principal factor, as discussed in the next Section.

A similar dominance of the numbers of industrial and water and sewage pollution incidents per km is seen, again, in South West Region. The largest numbers of oil related pollution incidents per km of river are seen in Southern and Thames Regions with Welsh Region contributing a very small percentage of the national total; 12.5 times less than in Southern Region. The significance and relative importance of these distributions is further discussed in the following Sections.

Figure 5 - Number of pollution incidents per km of river length by NRA Region



2.2 FARM POLLUTION INCIDENTS

2.2.1 Total Incidents

Altogether 2954 farm pollution incidents were substantiated in 1991, 13% of the total. The detailed breakdown of farm pollution statistics for each NRA Region is given in Appendix B.

2.2.2 Sources of Farm Pollution

Table 3 gives the national distribution of reported incidents by source for the years 1985 to 1990 plus the substantiated incidents for 1991. Figure 6 shows the distribution of substantiated agricultural incidents for 1991 by source. Of the 2954 incidents, 74% were related to cattle, specifically slurry stores (27% of the number of cattle related incidents) and yard and parlour washings (28% of the number of cattle related incidents). The number of incidents caused by silage was also significant at 21% of those related to cattle farming. The number of pollution incidents identified with pig farming was considerably lower than that associated with cattle, comprising 6.5% of the total number of agricultural incidents.

2.2.3 Regional Distribution

Figure 7 shows the distribution of agricultural pollution incidents that occurred in 1991 by NRA Region. Extensive Regional variation was seen with South West (24%), North West (16%) and Welsh (14%) Regions reporting the greatest numbers. The lowest proportions were in Southern, Thames and Northumbria (all around 3%). The number of pig slurry pollution incidents was relatively high in Anglian (23%), Severn Trent (18%) and Yorkshire (16%) Regions, whilst 50% of fish farm incidents were seen in Severn Trent Region (Appendix B). Pollution incidents involving pesticides, including sheep dips, were highest in Welsh and Anglian Regions (collectively 37% of all pesticide incidents).

2.2.4 Historical Trends

The numbers of farm pollution incidents, by NRA Region for the years 1985 to 1991, are given in Table 4, and Figure 8 shows the total number of farm pollution incidents reported annually between 1981 and 1991. North West (26%) and Yorkshire (13%) Regions recorded a decrease in the number of incidents reported for 1991 compared with the previous year. The improvements in North West were mainly a result of a 53% reduction in silage related incidents, whilst those in Yorkshire were largely due to a fall of 71% incidents involving both cattle and pig yard washings. The continuing deficit of rainfall compared with the long-term average during the silage making season may have contributed to the significant decrease experienced in the North West Region. The regulations controlling the storage of silage, slurry and agricultural fuel oil brought in under the Water Resources Act 1991, which came into force in September 1991, should also continue to contribute to the reduction in the numbers of these incidents.

2.2.5 Major/Serious Incidents

As in 1990, the greatest proportion (26%) of major pollution incidents in England and Wales (Table 2) was attributable to agricultural activities. Cattle slurry stores, silage effluent and land run-off contributed the greatest number of 'major' incidents although this was considerably lower than in previous years (Tables 4 & 5). This large reduction in 'major' farm pollution incidents may be partly as a consequence of the regulations mentioned earlier. The drier than usual weather may also have been a contributory factor.

Table 3 - Reported farm pollution incidents by source, 1985-1991. (Data prior to 1990 from NRA/MAFF (1989) and Water Authority/MAFF annual farm waste reports), Data for 1991 only are based on substantiated reports)

Source of Pollution	1985	1986	1987	1988	1989	1990	1991*
COWS							
Slurry Stores	717	695	705	801	589	531	591
Solids Stores	185	143	148	194	121	118	133
Yard/Parlour Washing	610	816	821	836	578	697	607
Land Run-off	180	244	212	345	380	335	306
Treatment System Failure	116	177	84	96	65	110	79
Silage Liquor	1006	592	1003	815	245	470	461
Total	2814	2667	2973	3087	1978	2261	2177
PIGS							
Slurry Stores	164	169	217	231	169	101	90
Yard Washing	85	89	54	59	64	66	45
Land Run-off	57	69	74	89	92	60	37
Treatment System Failure	7	21	21	20	19	20	19
Total	313	348	366	399	344	247	191
Others	383	412	551	655	567	639	586
Total	3510	3427	3890	4141	2889	3147	2954

*Substantiated Incidents

Table 4 - Total farm pollution incidents by NRA Region, 1985 - 1991. (Data for 1989 from NRA/MAFF annual farm waste reports; prior to 1989 from WA/MAFF reports). (R=reported; S=serious (NRA/MAFF criteria); Sub = substantiated; M = NRA Category 1, i.e. 'major')

NRA Region	1985		1986		1987		1988		1989		1990		1991	
	R	S	R	S	R	S	R	S	R	S	R	S	Sub	M
Anglian	304	30	275	41	223	42	205	31	204	23	179	-	212	3
Northumbria	70	6	59	6	94	6	80	15	63	6	65	6	79	5
North West	630	33	491	162	539	97	841	125	468	89	630	140	469	10
Severn Trent	594	103	521	92	654	130	625	77	431	44	271	46	402	27
Southern	188	58	156	52	189	46	95	17	80	13	84	12	93	3
South West	622	76	830	74	666	422	836	420	589	160	782	173	718	25
Thames	131	12	111	17	182	58	160	36	125	7	58	9	78	2
Welsh	462	95	404	56	716	123	567	112	354	67	547	134	421	4
Wessex	224	46	328	57	271	46	401	70	306	90	226	49	218	3
Yorkshire	285	113	252	65	336	20	331	37	269	23	305	39	264	17
Total	3510	572	3427	622	3890	990	4141	940	2889	522	3147	-	2954	99

Figure 6 - Substantiated farm pollution incidents by source, 1991

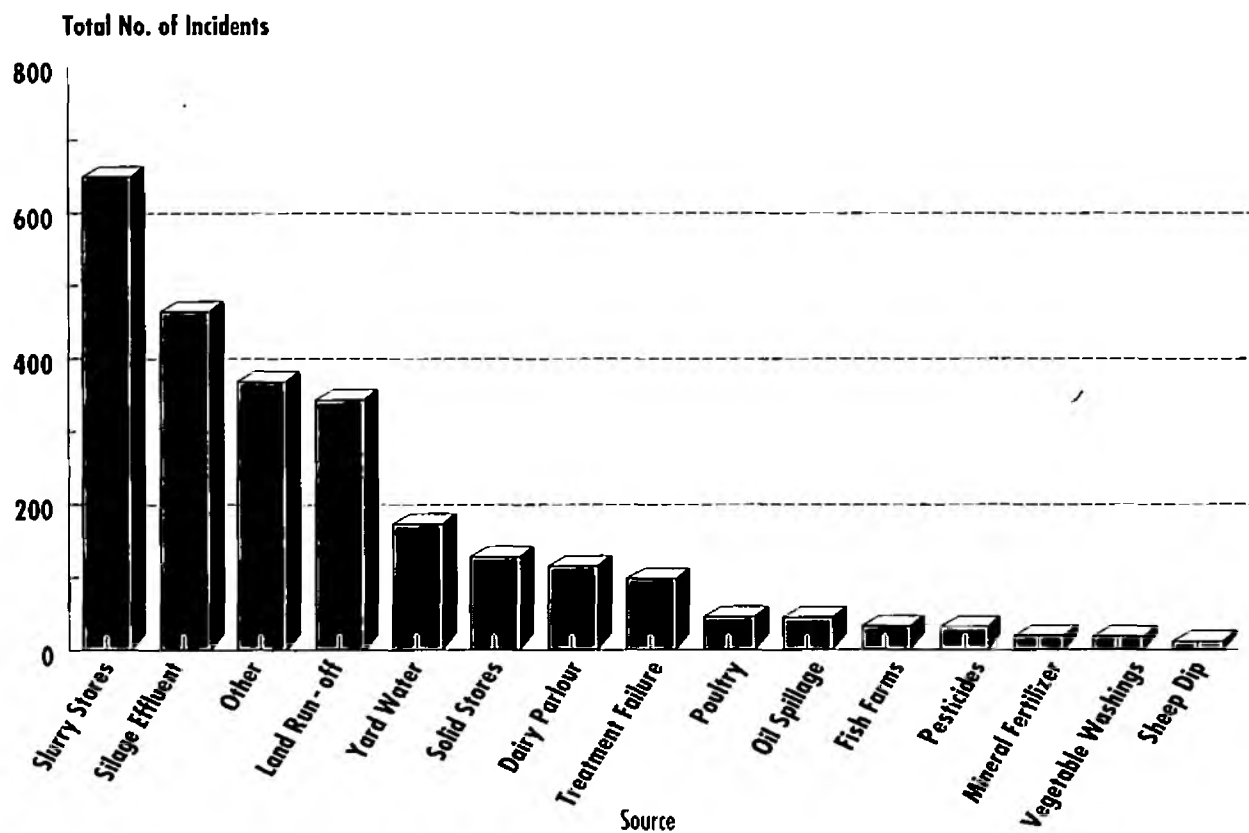
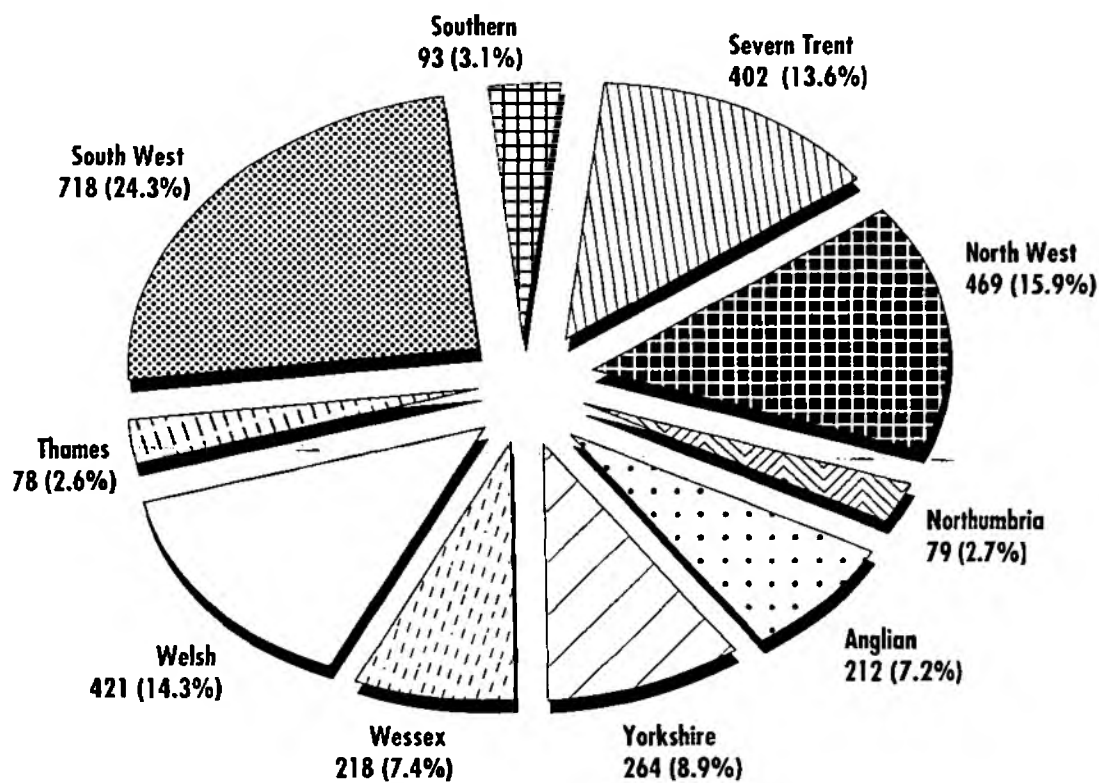


Figure 7 - Total substantiated farm pollution incidents by NRA Region, 1991



Total: 2954

Table 5 - Major (NRA Category 1) farm pollution incidents by source, 1991

Source of Pollution	Incidents		Major		%Major	
	1990	1991	1990	1991	1990	1991
COWS						
Slurry Stores	531	591	69	26	13.0	4.4
Solid Stores	118	133	5	1	4.2	0.8
Yard/Parlour Washings	697	607	30	7	4.3	1.2
Land Run-off	335	306	12	13	3.6	4.2
Treatment System Failure	110	79	9	3	8.2	3.7
Silage Liquor	470	461	62	22	13.2	4.8
PIGS						
Slurry Stores	101	90	6	3	5.9	3.3
Yard Washing	66	45	3	0	4.5	-
Land Run-off	60	37	5	0	8.3	-
Treatment System Failure	20	19	5	1	25.0	5.3
Others	639	586	33	23	5.2	3.9
Total	3147	2954	239	99	7.6	3.4

Figure 8 - Total number of reported farm pollution incidents in England and Wales, 1981-1991

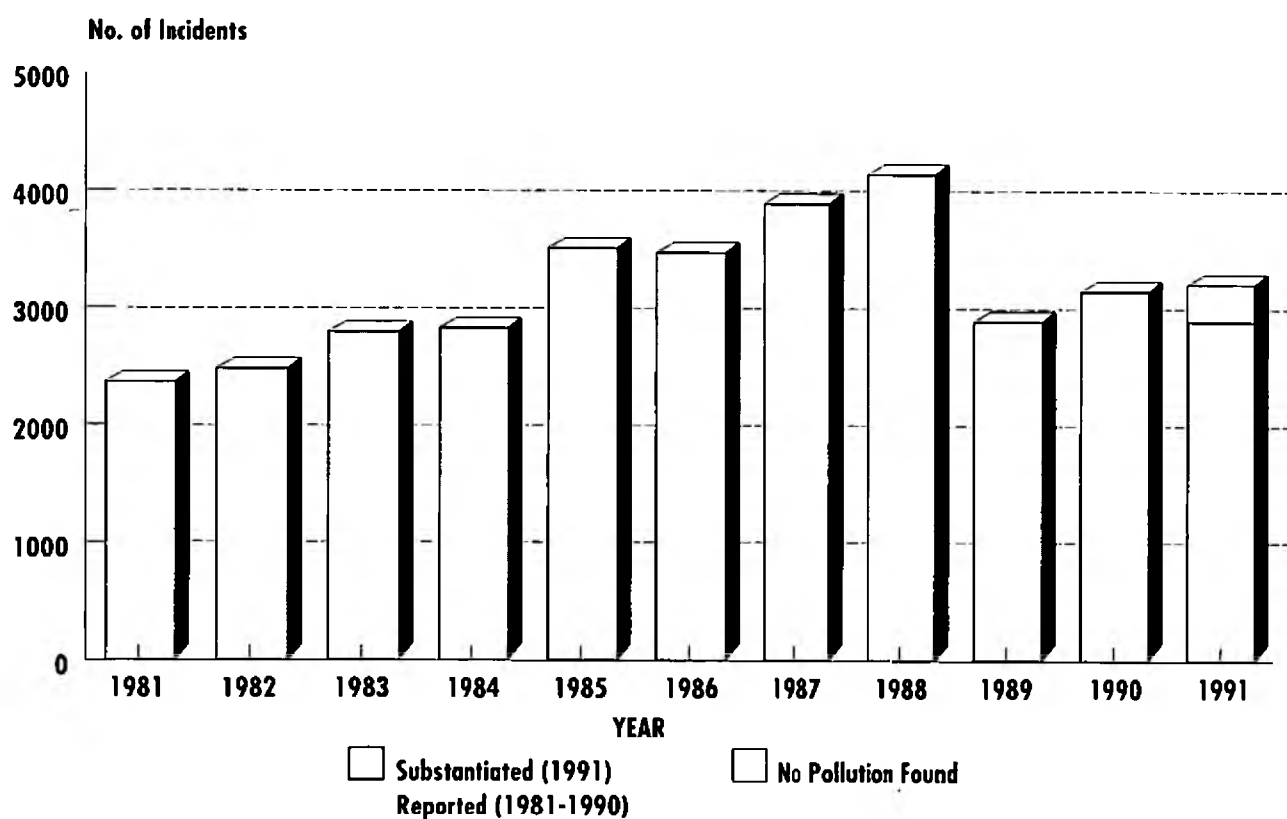
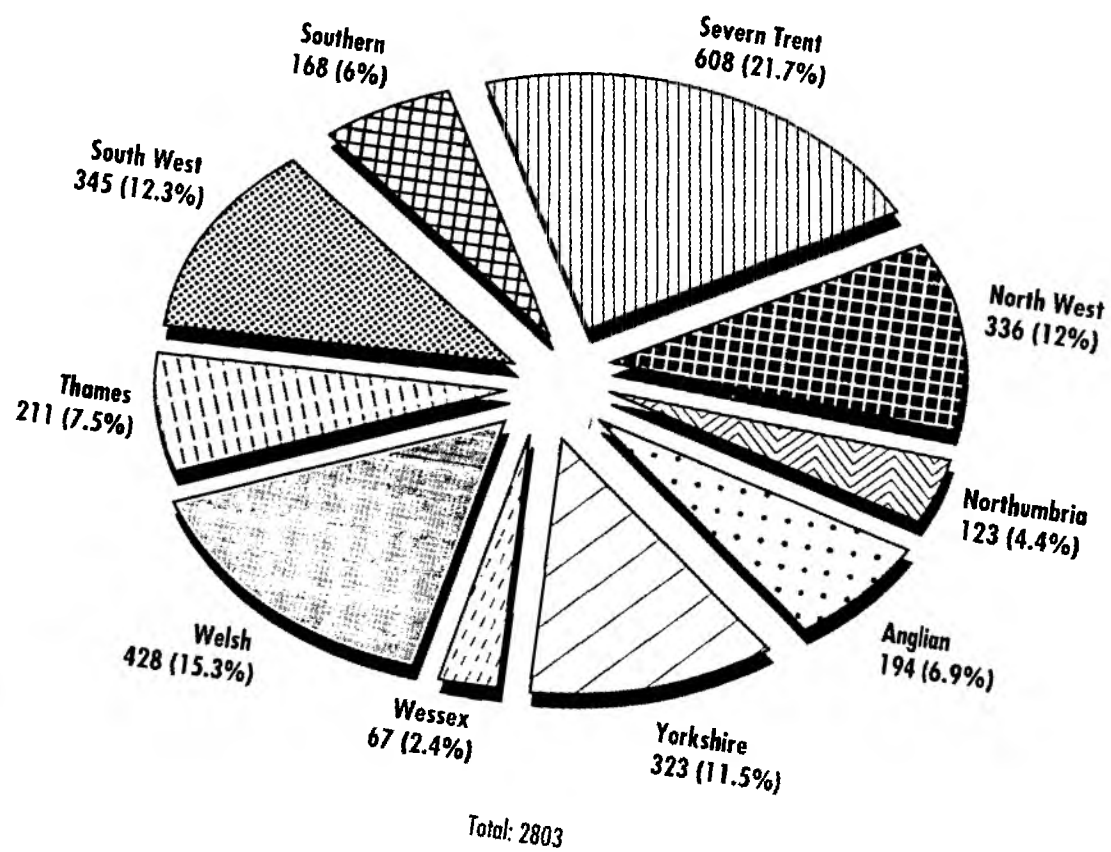


Figure 9 - Total substantiated industrial pollution incidents by NRA Region, 1991



2.3 INDUSTRIAL POLLUTION INCIDENTS

2.3.1 Total Incidents

A total of 2803 industrial pollution incidents were substantiated in 1991. This figure comprises 12.5% of the total number of substantiated incidents.

2.3.2 Regional Distribution

The distribution of substantiated industrial pollution incidents by NRA Region is shown in Figure 9. The largest proportions were found in Severn Trent (22%) and Welsh (15%) Regions, with the least number in Wessex (2%).

A detailed breakdown of the types of industries which contribute to pollution events is held by some Regions, and it is interesting to examine the available data to ascertain which industries present the greatest risk of causing such incidents. The most significant sources appeared to be the mineral industry. In Northumbria 37% of incidents were attributable to this source and around 31% in North West, 16% in Severn Trent, 7% in South West, 22% in Thames and 6% in Wessex Region. The chemical industry accounted for a significant proportion of incidents in Northumbria (21%), Wessex (20%), South West and Welsh Regions (both 16%). Pollution as a result of metal input accounted for less than 10% of incidents in those Regions which had these data.

2.3.3 Historical Trends

The total numbers of reported industrial pollution incidents for the years 1987 to 1990 and incidents substantiated in 1991, by NRA Region, are given in Table 6. Nationally, there has been virtually no change in the total number of incidents in 1991, although the figures presented in 1990 were given for reported (rather than substantiated) incidents in the majority of Regions. The data for four Regions are, however, directly comparable and three of these have shown a decrease in the number of substantiated industrial pollution events; Anglian (9% decrease), Wessex (83%), and Yorkshire (24%). North West Region has shown an increase of 26%. The data presented for 1990 in Wessex Region included oil based incidents and if these are discounted the decrease in the Region changes slightly to 78%. The remaining Regions have shown an increase in the number of industrial pollution incidents reported, ranging from 2% in Southern to 208% in Welsh where there were high numbers of incidents in the significant and minor categories.

2.3.4 Major Incidents

Of the total number of substantiated incidents of an industrial nature, only 3% were classed as 'major' and, of the overall total of 'major' incidents, those from industrial sources comprised 22% (Figure 4). In 1991, there was some variation in the proportion of 'major' incidents between the NRA Regions, ranging from 1.2% in Thames to 42% in Severn Trent Region.

Table 6 - Total reported industrial pollution incidents by NRA Region, 1987-1991. (Data up to 1988 from DoE Digest of Environmental Pollution and Water Statistics 1988 and 1989 and provided by previous Water Authorities)

NRA Region	1987	1988	1990	1991*
Anglian	180	169	213	194
Northumbria	42	66	117	123
North West	336	338	267	336
Severn Trent	785	1108	350	608
Southern	181	182	164	168
South West	252	341	339	345
Thames	190	323	385	211
Welsh	237	353	138	428
Wessex	52	160	403 _a	67
Yorkshire	537	620	426	323
Total	2792	3660	2802	2803

*Substantiated Incidents

_a Includes oil based incidents

2.4 OILS AND RELATED PRODUCTS

2.4.1 Total Incidents

There were 5288 oil related pollution incidents substantiated in 1991. This accounts for 23.5% of the total number of substantiated pollution events occurring during the year.

2.4.2 Regional Distribution

The Regional distribution of oil pollution incidents in 1991 is shown in Figure 10. Severn Trent (23%), Anglian (15%), and Thames (16%) Regions contributed the largest proportion of oil related incidents, whilst Welsh (2%) and Northumbria (4%) recorded the lowest proportions.

Pollution events from oil sources accounted for a high proportion of the total number of incidents recorded in some Regions with 36% in Anglian Region, 27% in Severn Trent, 31% in Southern and 44% in Thames Regions. In Welsh Region the number of oil pollution incidents was comparatively low, comprising only 5.3% of the Regional total.

It was not possible to provide a detailed national breakdown of oil pollution incidents into various types of oil, but information was available for some Regions. Diesel oil accounted for 29% of oil pollution reports in Northumbria, 12.5% in North West, 9% in Southern, 24% in South West, 27% in Thames, 32% in Welsh and 53% in Wessex Region. Petrol was responsible for 10% of reported oil pollution incidents in Northumbria, 3% in North West, 9% in Southern, 6% in South West, 7% in Thames, 9% in Welsh and 13.5% in Wessex Region. In Northumbria 5% of oil incidents were derived from heating oil and around 3% in North West, 3% in Southern, 11% in South West, 15% in Thames, 46% in Welsh and 17% in Wessex Region. The majority of the remaining oil related incidents were unclassified.

2.4.3 Historical Trends

The total number of reported oil related pollution incidents for the years 1987 to 1990, and of substantiated incidents in 1991, by NRA Region, are presented in Table 7. An apparent ten fold increase in oil pollution incidents in Wessex Region is explained by the allocation in 1990 of those oil based incidents which were connected with industrial discharges to the 'industrial' category rather than 'oil'. For the Regions that reported the number of substantiated incidents in 1990, an increase was also noticed in Anglian (25%) whilst slight decreases were reported in North West (3.7%) and in Yorkshire (14.2%) Regions.

Table 7 - Total oil pollution incidents by NRA Region, 1987-1991. (Data up to 1988 from DoE Digest of Environmental Pollution and Water Statistics 1988 and 1989)

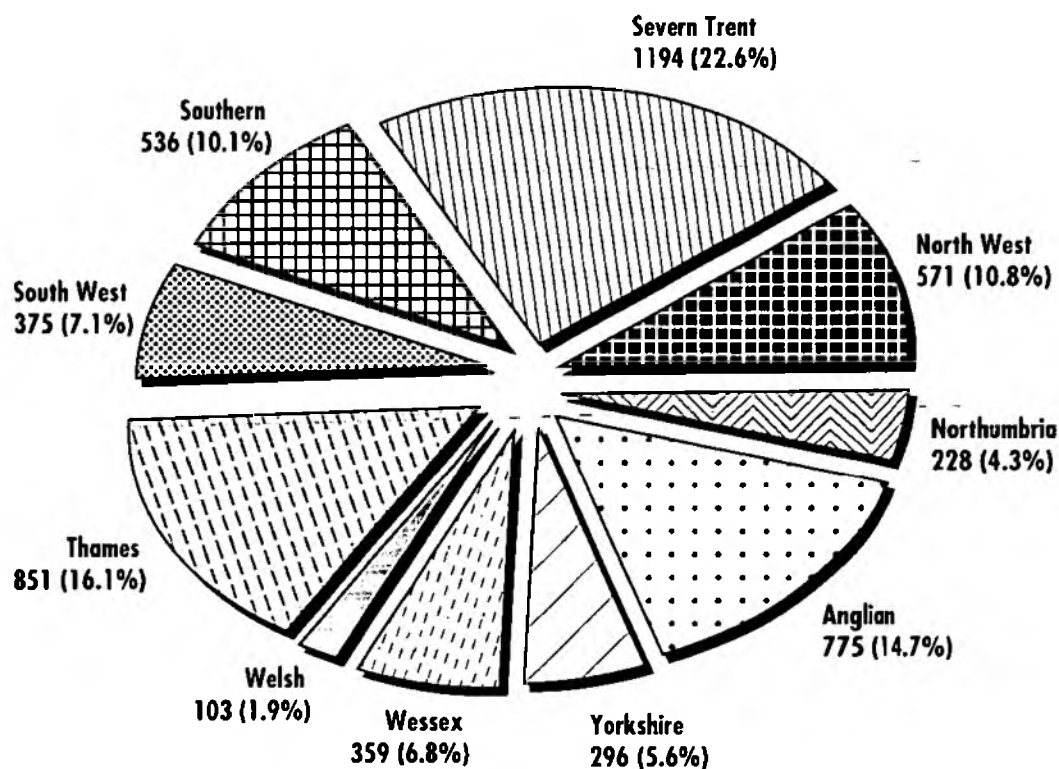
NRA Region	1987	1988	1990	1991*
Anglian	603	478	620	775
Northumbria	128	135	248	228
North West	494	508	593	571
Severn Trent	1078	1300	1893	1194
Southern	483	459	492	536
South West	208	254	349	375
Thames	861	1256	1122	851
Welsh	133	197	250	103
Wessex	393	435	34	359
Yorkshire	402	403	345	296
Total	4783	5425	5946	5288

*Substantiated Incidents

2.4.4 Major Incidents

Only 1.3% of the oil pollution incidents fell into the 'major' category but, nevertheless, such incidents (69) accounted for 18% of 'major' pollution events from all categories, as shown in Figure 4b. The greatest number of major oil pollution incidents arose in Severn Trent Region (43%), with the remaining Regions recording between 1% in Welsh, Anglian, and Southern to 16% in North West.

Figure 10 - Total substantiated oil pollution incidents by NRA Region, 1991



Total: 5288

2.5 SEWAGE & WATER INDUSTRY RELATED POLLUTION INCIDENTS

2.5.1 Total Incidents

There were 6351 sewage and water industry related pollution incidents substantiated in 1991. This category of pollution incident accounted for 28.3% of the total in England and Wales during the year.

2.5.2 Regional Distribution

The Regional distributions of substantiated sewage and water industry related pollution incidents are shown in Figure 11, which shows a range from 3% in Wessex to 21% in Severn Trent Region.

Regionally, a large but variable proportion of sewage incidents arose from Water Services Company operated combined storm overflows, ranging from 52% of reported incidents in North West Region, to none in Anglian. Similarly, sewer dykes and village drains gave rise to a sizeable but variable proportion of sewage related pollution incidents, from none in Northumbria Region to 33% in Anglian Region. Other sources of sewage and water industry related pollution incidents included both Water Services Co. operated and private sewage treatment works, sewage pumping stations, surface water sewers and water treatment works.

2.5.3 Historical Trends

The total numbers of reported sewage related pollution incidents for the years 1987 to 1990 and substantiated in 1991, for each NRA Region, are given in Table 8. There has been a consistent increase in the number of sewage and water industry related pollution incidents since 1987. Nationally, there was a 9% increase in the total number of incidents in 1991, although the figures given for 1991 are for substantiated (rather than reported) incidents. This is partly due to the inclusion of pollution events relating to water supply which were not included in the 1990 report. The data for four Regions are directly comparable and of these two have recorded a decrease in the number of substantiated pollution events; Wessex (1% decrease) and Yorkshire (0.4% decrease). Increases were seen in Anglian (57%) and North West (2%) Regions.

2.5.4 Major Incidents

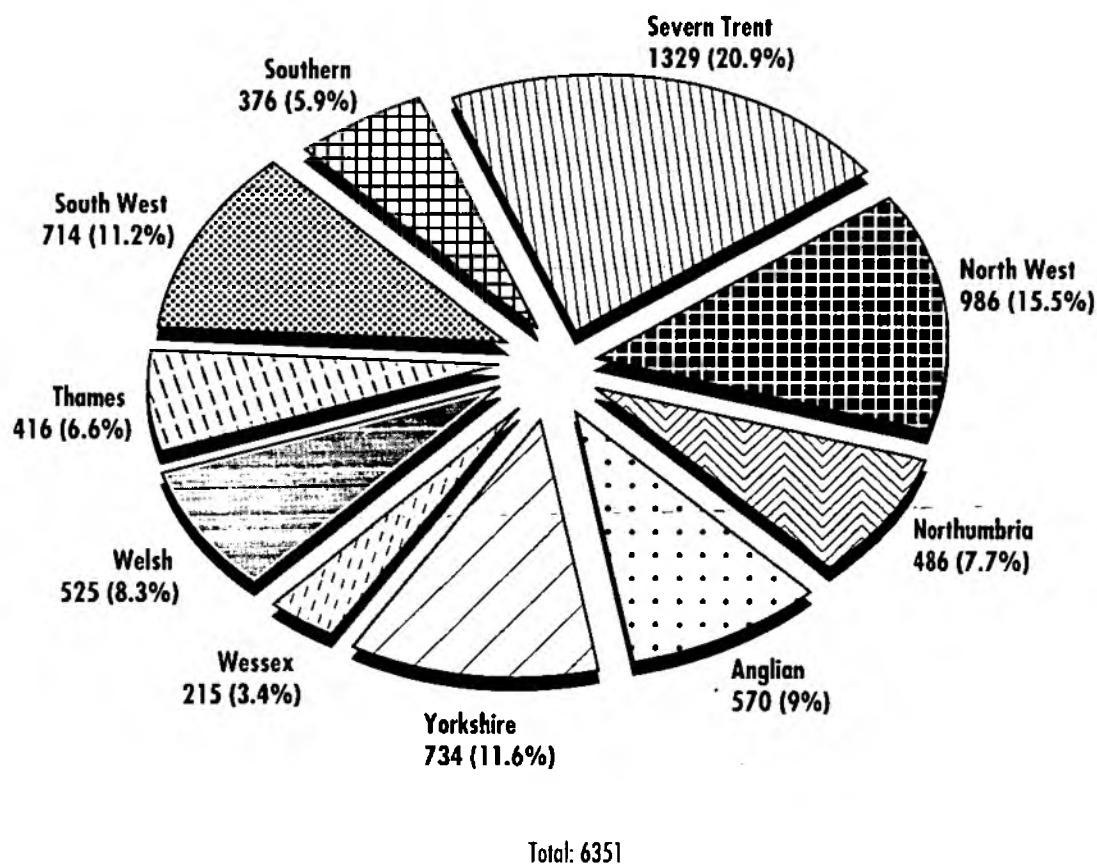
Only 1.5% (96) of the 6351 sewage and other water industry related incidents fell into the 'major' pollution category, but contributed 25% of the total of 'major' pollution incidents from all sources (Fig 4b, Table 2). The proportion of these in each Region varied appreciably, ranging from none in Wessex Region to 43% of the Regional total for 'major' incidents in Yorkshire.

Table 8 - Total reported sewage-related incidents by NRA Region, 1987-1990 plus substantiated Incidents for 1991. (Data up to 1988 from DoE Digest of Environmental Pollution and Water Statistics 1988 and 1989)

NRA Region	1987	1988	1990	1991*
Anglian	381	373	362	570
Northumbria	232	273	477	486
North West	460	614	968	986
Severn Trent	880	772	424	1329
Southern	320	345	487	376
South West	427	488	656	714
Thames	423	610	765	416
Welsh	402	476	717	525
Wessex	129	168	218	215
Yorkshire	524	459	737	734
Total	4177	4578	5811	6351

*Substantiated Incidents

Figure 11 - Total substantiated sewage and water industry related pollution incidents by NRA Region 1991



3 LIMITATIONS OF DATA

Reports of pollution incidents are dependant on public observation and for this reason their quality will be influenced by factors such as population density, public awareness, and the visibility of the pollution. Incident information is therefore likely to underestimate the true extent of episodic problems to a degree which varies across England and Wales.

For a number of reasons, difficulties arise in the assessment of impact severity associated with an incident. The public may not report the incident until a long time after it has occurred, or the entry of polluting material may cease prior to the arrival of NRA staff. In both instances it may be impossible to substantiate the incident. Incidents also occur after dark which makes their immediate investigation more difficult. There is also an inevitable amount of subjectivity remaining in the assessment of severity, and this leads to Regional differences in the interpretation of the new national categorisation system, particularly in the designation of incidents into categories 2 (Significant) and 3 (Minor).

The problems associated with positively identifying the pollutant source when investigating an incident have led to a large number being categorised as 'other' incidents, rather than being assigned to specific pollutant sources. In 1991, 5073 incidents were classified as 'other', representing 23% of substantiated incidents, although the proportion of major, 'other' incidents (10%) was much lower than the proportions assigned to specific categories and was 4% lower than in 1990.

The 'other' category does not, however, equate to 'unknown' since it includes the wide variety of alternative sources of pollution including road and rail accidents, domestic spillages, illegal dumping, leachate problems and many other individual sources which cannot be ascribed to one or other of the main categories.

Lastly, even when the pollutant source has been identified the interpretation of pollutant source categories (ie oil, industrial, sewage, farm and indeed for the type of farm incident where this is separately categorised) is often rather subjective. For instance, within the farm category it is often difficult to assign an incident to a source category due to the involvement of more than one pollutant material (eg slurry and silage liquor).

4 NRA COURT ACTIONS

4.1 COURT ACTIONS

Table 9 shows the Regional distribution of court actions for pollution incidents that occurred in 1991 and for which prosecution took place in 1991, Table 10 shows the Regional distribution of incidents that occurred in 1991 but were prosecuted between January and March 1992 and Table 11 the outstanding prosecutions for incidents arising in 1991. A table of all the prosecutions that were brought for incidents that occurred in 1990 is given in Appendix C.

By the 31st March 1992, 356 prosecutions for pollution incidents occurring in 1991 had been heard in court and 347 (97%) of these resulted in convictions. There were 119 cases which had still to come to court as of the 1st April 1992.

In addition to the court action taken against polluters, the NRA also issues formal cautions. The purpose of a formal caution is to deal quickly with less serious incidents, but nevertheless reduce the chances of further offences being committed. Before a formal caution is issued there must be evidence of the polluter's guilt, the polluter must admit the offence and the polluter must understand the significance of a caution and give informed consent to being cautioned. Such cautions can also be produced in court if the polluter should subsequently offend again. The Regional distribution of formal cautions issued for offences in 1991 is given in Table 12. A total of 55 formal cautions was issued in 1991, for pollution offences that occurred in 1991. A further 50 remained to be issued on the 1st December 1991

Table 9 - Regional distribution of court actions/prosecutions in 1991 against incidents occurring in 1991

NRA Region	Number of Incidents Prosecuted	Convictions
Anglian	23	22
Northumbria	18	16
North West	42	41
Severn Trent	32	32
Southern	3	3
South West	26	26
Thames	30	30
Welsh	26	26
Wessex	11	10
Yorkshire	21	21
Total	225	220

Table 10 - Regional distribution of court actions/prosecutions taken between January - March 1992 against incidents occurring in 1991

NRA Region	Number of Incidents Prosecuted	Convictions
Anglian	14	14
Northumbria	5	4
North West	31	31
Severn Trent	16	16
Southern	2	2
South West	9	8
Thames	16	16
Welsh	15	14
Wessex	10	9
Yorkshire	6	6
Total	124	120

Table 11 - Regional distribution of court actions/prosecutions outstanding on April 1st 1992 against incidents occurring in 1991

NRA Region	Number of Prosecutions Outstanding
Anglian	12
Northumbria	4
North West	36
Severn Trent	0
Southern	13
South West	3
Thames	7
Welsh	15
Wessex	0
Yorkshire	29
Total	119

Table 12 - Regional distribution of formal cautions issued with respect to incidents occurring in 1991

NRA Region	Cautions issued in 1991
Anglian	2
Northumbria	3
North West	29
Severn Trent	0
Southern	1
South West	4
Thames	2
Welsh	6
Wessex	3
Yorkshire	5
Total	55

Table 13 - Prosecutions in 1991 by pollution source category

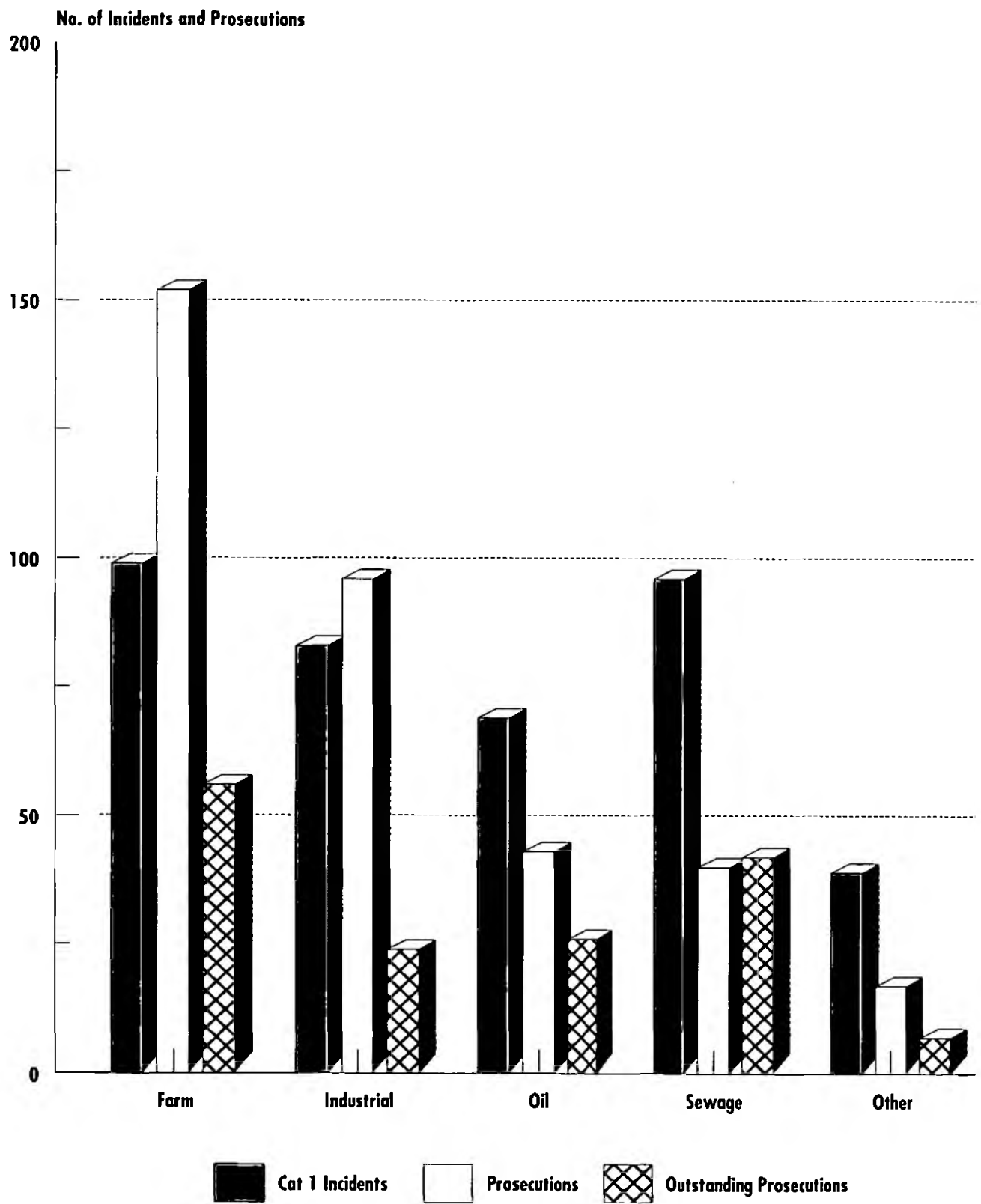
Category	Number Major Incidents	Number Incidents Prosecuted	Number Convicted	Number of Prosecutions taken relative to the number of major incidents (%)
Farm	99	159	156	161
Industrial	83	96	95	116
Oil	69	43	40	62
Sewage	96	40	39	42
Other	39	18	17	46
Total	386	356	347	90

Table 14 - Prosecutions by pollution source category with detailed breakdown of agricultural incidents, 1987-1991. (Data up to 1989 from NRA/MAFF, 1990) (I=Incidents, P=Prosecutions)

Source of Pollution	1987		1988		1989		1990		1991*	
	I	P	I	P	I	P	I	P	I	P
FARM - Cows										
Slurry Stores	705	56	801	41	589	64	531	40	591	46
Solid Stores	148	5	194	1	121	2	118	1	133	0
Yard/Parlour Washings	821	7	836	11	578	14	697	27	607	14
Lead Run-off	212	4	345	8	380	20	335	15	306	15
Treatment System Failure	84	6	96	1	65	3	110	10	79	7
Silage Liquor	1003	96	815	55	245	28	470	13	461	41
FARM - Pigs										
Slurry Stores	217	15	231	16	169	16	101	11	90	9
Yard Washings	54	2	59	0	64	0	66	0	45	3
Land Run-off	74	11	89	5	92	2	60	1	37	9
Treatment System Failure	21	5	20	0	19	3	20	1	19	4
FARM Other	551	18	655	10	567	9	639	4	586	11
FARM Total	3890	225	4141	148	2889	161	3147	123	2954	159
Industrial	2792	102	3660	103	2770	27	2802	76	2803	96
Oil	4783	20	5425	29	5510	16	5946	21	5288	43
Sewage	4177	12	4578	12	4350	61	5811	27	6351	40
Other	5017	16	6039	0	8671	60	10,437	35	5073	18
Total	20,659	375	23,843	292	24,190	164	28,143	282	22,469	356
% Total Prosecuted	-	1.8	-	1.2	-	0.7	-	1.0	-	1.6

*Substantiated Incidents

Figure 12 - Prosecutions by pollution incident category, 1991



4.2 DISTRIBUTION OF PROSECUTIONS BY POLLUTION SOURCE CATEGORY

The variation in the number of prosecutions relative to the number of major incidents, by pollution source category, is presented in Table 13 and in Figure 12. The rate of prosecutions, especially those arising from agriculture and industry, has increased considerably when compared with that for 1990. A large number of category 2 (significant) incidents have also been successfully prosecuted within these pollution source categories.

All regions follow the policy of prosecuting Category 1 pollution incidents where there is sufficient evidence to take such action. There were occasions where the source of the pollution could not be identified or where the event was caused by vandalism, or where there was overwhelming mitigation (such as an emergency discharge). In a few cases formal cautions or solicitors' letters have been issued as an alternative to court action.

One point which should be noted is that the collection of evidence for presentation in court and proving culpability in the case of sewage related incidents is often more difficult than in others. This accounts for the relatively low number of prosecutions of this type of incident. Sewage pollution incidents are often due to problems on the sewerage network or are due to cross connections, and in these cases it can be difficult to apportion blame. There is also a defence in law, for the Water Companies, when pollution is caused by an illegal discharge by a third party. These are often difficult to apprehend and when there is a prosecution it will usually be brought by the Water Company under the Water Industry Act 1991 and, thus not appear in the NRA's statistics. Most Water Company consents, which were inherited from pre-NRA consenting procedures, are based on look-up tables which require compliance by 95% of samples within a specified time frame, usually one year. Thus, if a pollution event is the only tripartite sampled breach in a rolling twelve month period, the company cannot be prosecuted. The NRA is now setting consents which include limits that may not be exceeded at any time.

4.3 HISTORICAL TRENDS

The prosecutions taken by pollution incident source category between 1987 and 1991 are given in Table 14. The prosecutions taken in respect of incidents arising from agriculture are further broken down into the categories used in previous years.

4.4 FINES

Tables 15 and 16 give the ranges of fines and costs awarded arising from pollution incidents in 1991; Table 15 gives a Regional breakdown whilst Table 16 gives those obtained by pollution source category. The largest fine of £200,000 was imposed against a company for an oil pollution incident, the details of which are given in the following section. Overall, in the majority of Regions, there has been an increase in the levels of the highest fines by an order of magnitude compared with 1990, a development which should encourage potential offenders to take better care.

Table 15 - Fines and costs awarded for pollution incidents which resulted in convictions (January 1991 - March 1992)

NRA Region	Range of Fines	Range of Costs
	£	£
Anglian	0 - 12,000	83 - 1272
Northumbria	0 - 10,000	200 - 1576
North West	200 - 11,000	200 - 1098
Severn Trent	100 - 15,000	100 - 2500
Southern	100 - 3000	255 - 862
South West	0 - 13,000	0 - 9137
Thames	200 - 15,000	50 - 720
Welsh	50 - 200,000	20 - 5000
Wessex	200 - 7000	300 - 2095
Yorkshire	250 - 7500	124 - 1221
Nationally	0 - 200,000	0 - 9,137

Table 16 - Range of fines and costs by pollution incident source

Pollution Source	Range of Fines	Range of Costs
	£	£
FARM	50 - 10,000	60 - 1176
INDUSTRY	30 - 13,000	125 - 2073
OIL	0 - 200,000	125 - 5000
SEWAGE	0 - 22,000	83 - 1576
OTHER	50 - 2560	20 - 1500

4.5 NRA PROSECUTIONS FOR OFFENCES COMMITTED IN 1991

4.5.1 Introduction

This section examines a variety of prosecutions which were brought by the NRA for offences that occurred in 1991. The examples chosen illustrate the way in which the legal process has operated during the period, depicting the types of incidents dealt with by NRA staff on a daily basis; it further highlights both legal precedents and some of the more interesting and unusual cases. (Note: In 1991 the Water Act 1989 was replaced by the Water Resources Act, 1991; incidents were prosecuted under the legislation in force at the time of the offence.) Prosecutions brought for breaches of consent are not discussed in this section.

4.5.2 Persistent Polluters

During 1991 it became apparent that both the Magistrates' and Crown Courts were imposing higher fines on companies that persistently polluted the environment. For example, a Company that caused a Category 1 pollution incident by spilling 20 tonnes of heavy fuel oil into the Severn Estuary was prosecuted under Section 107(1)(a) of the Water Act 1989. The Company funded a clean-up operation costing £68,000 as well as a study into migratory birds costing a further £25,000. However, the poor pollution record of the Company, with six previous convictions, did not outweigh their subsequent co-operation and the Company was fined £200,000.

Another Company with a poor environmental record was found guilty on three charges for illegally discharging from a paper mill to the River Goyt. The Company was fined £8000.

Similarly, a Company in the South West allowed a discharge of highly acidic, quarry runoff with a concentration of heavy metals to enter the River Okement which resulted in fish mortalities. The Company on three previous occasions had caused similar incidents, following rainfall after sustained periods of dry weather, and was fined £13,000 in this case. An appeal by the Company in respect of its consent to discharge is currently being considered by the Department of the Environment and subject to the decision a new treatment plant will be installed at the quarry.

Two large Companies were prosecuted for persistent offences during the same year. The first was prosecuted for four separate incidents, one of which caused a substantial fish kill. On 2nd February 1991, 45m³ of chlorocarbon effluent was discharged into a canal both through storm drains and through a consented outfall when a pump failed. The discharge contained both carbon tetrachloride and perchloroethylene which the Company is currently permitted to discharge in very small amounts. However, eight hours after the pollution event the concentrations of these compounds were much greater than the consented levels. The Company claimed that the pump failure could not have been foreseen, but this was not accepted by the court in the light of NRA evidence that the environmental damage prevented the canal from achieving its water quality objective and the Company was fined £5000. Following another incident at the same site, only two days later, the Company was fined a further £2000.

At another works belonging to the same Company, on 1st March 1991, one tonne of ethylene dichloride was released, partly via storm drains, into a canal. The effluent was discharged when a build up of pressure and the failure of a safety valve caused the holding tank to burst. The Company claimed that the decision to flush the effluent was taken in order to prevent a fire and that under Section 108(2) of the Water Act 1989 it should not be convicted because the discharge was made in 'an emergency to avoid damage to life or health'. This defence was rejected by the Court and the Company was fined £2000.

During May 1991, the Company again caused an incident when 5m³ of ammoniacal brine was discharged into the Trent and Mersey Canal. The contamination caused the deaths of 150,000 fish along an eight mile stretch of the watercourse and the Company was prosecuted under Section 41 of

the Salmon and Fresh Water Fisheries Act 1975 and fined £8200. In addition, the Company faces compensation claims from both Anglers and the British Waterways Board, which could amount to £500,000.

A series of prosecutions was brought against another organisation for repeated pollution offences. These all occurred at the same oil refinery in Essex and resulted in clean-up operations costing £140,000. The first spill occurred when oil from a deballasting tank which was being cleaned up, passed into a tilted/plate separator due to the failure of a valve. The separator was overwhelmed with heavy black oil which discharged into Holehaven Creek. The accident affected three quarters of a mile of the Creek, coating it with oil, oiled 70 birds and caused a large fish kill.

A month later between 5 and 8 tonnes of light crude were accidentally spilled whilst a tanker was being unloaded. The operation was interrupted by the tide and on its resumption the wrong valve was opened which allowed the oil to escape. The incident oiled 60 birds and caused an oil slick 3 miles long.

A further incident occurred when a leak in a heat exchanger caused raffinate, a waxy oil by-product, to enter a cooling water system. As a result the oil/water separator became clogged and a large volume of raffinate escaped into a watercourse, coating the east coast of Holehaven Creek. On investigation it was found that the drain plug, which should have been made with stainless steel, but was in fact mild steel, had corroded within six months of installation. The Company was fined £15,000 each for the two former incidents and £10,000 for the latter.

4.5.3 Legal Precedents

It is not always easy to bring a successful prosecution and decisions taken in court can serve to clarify the law. An example of setting such legal precedents was seen in 1991 when the NRA brought a prosecution against Harcros Timber and Building Supplies Ltd. The judgement of the Divisional Court ruled that the tripartite procedure governing the analysis of samples used in evidence applies to all liquid samples. Prior to the enactment of the Water Act 1989, these procedures had been governed by the Water Resources Act 1963, Section 113 which stipulated that on taking a sample of effluent, the occupier must be informed and the sample be split into three separate, marked containers. Section 148 of the Water Act 1989, subsequently consolidated in the Water Resources Act 1991 (Section 209), replaced this provision, but with a significantly, less restrictive distinction in the wording. This states 'the results of the analysis of any sample taken on behalf of the Authority in exercise of any power conferred by this Act shall not be admissible in any legal proceedings in respect of any effluent' unless the tripartite procedure has been followed.

In the case of **NRA vs Harcros Timber and Building Supplies Ltd**, the NRA relied on a sample of the watercourse affected by the discharge rather than the effluent itself. The sample of the watercourse had not been divided into three parts, with one being served on the defendant. The court concluded that the 'legislative purpose of Section 209 was to protect the defendant in a case of impending legal proceedings and there was no distinction between a sample of effluent and a sample of the watercourse if both specimens were required for a prosecution'.

As a result of this decision the NRA has to ensure that any sample which it intends to submit in evidence has been taken in a tripartite manner. This complicates the business of investigating and taking court action over pollution incidents, as well as increasing the use of scarce resources.

4.5.4 Agricultural Pollution

Protection of the water environment from the various sources of agricultural pollution requires a broader approach than court action. The NRA has approached the agricultural community in a variety of ways regarding the sources of agricultural pollution. The NRA's Farm Waste Group has extensively researched agricultural waste and the ways of achieving improved management and disposal methods which are highlighted in their recent report (NRA, Water Quality Series No. 6, 1992).

Prosecution is however used, in appropriate cases, as a means of controlling pollution from agricultural sources and the following examples taken in respect of this type of incident demonstrate cases which are typical in nature and environmental impact.

A dairy Company has paid fines of £7800 for six pollution offences in the period up to December 1991. One incident, which occurred in December 1991, resulted in an organic discharge into the River Tern. This was the result of the failure of a valve on a tank of caustic alkali. The alkali was usually neutralised before passing into the treatment plant but as a result of the valve failure and the consequent exhaustion of the neutralising solution, caustic alkali passed into the treatment plant, which in turn failed, and untreated dairy effluent was passed directly into the watercourse. A lack of maintenance and safety checks contributed to the incident and the company was convicted under Section 85(1) of the Water Resources Act 1991 and fined £1500. The Company has now committed £8000 to improving the treatment plant.

Another incident involved an agricultural crop sprayer who caused the pesticides triazatine and triazophon to enter the Paxtondean Burn resulting in the deaths of 6000 trout. The Burn did not suffer long term damage and had fully recovered within six months although it did require complete restocking. In sentencing, the Magistrates said that they were taking into account the defendants financial circumstances and ordered him to pay costs of £200 and he was given a one year conditional discharge.

A pollution event that occurred in April 1991 involved the discharge of highly polluting septic blood. The source of the contamination was traced to a poultry farm where it was discovered that the drainage system had been incorrectly plumbed to a surface water drain rather than the sewer. The defendant claimed that the pollution event was attributable to both a spillage whilst emptying the blood tank and the wrongly connected drainage system and further claimed that the contractors responsible for installing the drainage system were liable. The NRA however countered that if an adequate maintenance programme had been followed the fault would have been identified and rectified prior to the occurrence of an incident. The firm was convicted under Section 107 of the Water Act 1989 and fined £2500.

4.5.5 Identification of the Defendant

During 1991 the NRA attempted to bring the first prosecution for personal liability to court. Unfortunately the case was never heard because the defendant could not be located. The case involved two oil pollution incidents, the first of which occurred when a large quantity of oil was released during the scrapping of a submarine. The second incident occurred under similar circumstances whilst a destroyer was being dismantled. The Company went into liquidation and as a consequence the NRA was forced to drop the charges. The NRA then attempted to bring a personal liability case against a director of the company under Section 177 of the Water Act 1989. The case was dismissed because the director could not be traced.

4.5.6 Alternatives to Prosecution

It is not always possible to bring a prosecution and the following example illustrates a case where the NRA issued a formal warning to a Company because the incident was viewed as being outside the immediate control of the Company. The incident involved a collapsed rising main which allowed the pumped full flow of sewage into the Stourbridge Canal. The organic pollution depleted oxygen concentrations in the water and resulted in fish mortalities in the water directly affected and endangered large numbers of others further downstream.

5 CONCLUSIONS

- 1 A total of 29,372 pollution incidents were reported in England and Wales in 1991, of which 22,469 (76%) were substantiated. Of the substantiated incidents, 1.7% were classified as 'major' incidents as defined by the NRA incident classification system.
- 2 Overall the number of 'major' pollution incidents reported in 1991 appears to have decreased by 41% since 1990. The greatest proportion of 'major' incidents arose as a result of agricultural and sewage and water industry activities.
- 3 Sewage pollution accounted for 28% of the total substantiated incidents in 1991. In many Regions the number of sewage-related incidents has continued to increase. The proportion of sewage and water industry pollution incidents classified as 'major' was nevertheless relatively low at 1.5%.
- 4 Oil pollution accounted for 23.5% of the total substantiated incidents in 1991. Oil was a very important source of incidents in the Severn Trent, Anglian and Thames Regions, but again only a relatively low proportion (1.3%) were classified as 'major'.
- 5 Industrial pollution accounted for 12.5% of total substantiated incidents in 1991. Of the 2803 substantiated industrial incidents only 3% were classified as 'major'. Industrial pollution incidents were largely attributable to mineral and chemical source categories.
- 6 Substantiated farm pollution incidents accounted for 13% of the total, and 26% of the 'major' incidents. It was a very important source of incidents in the South West, North West and Welsh Regions. The number of 'major' farm pollution incidents was, however, substantially less than in 1990.

REFERENCES

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APPENDIX A

DEFINITIONS

NRA Definitions of Pollution Incident Categories

Category 1

A 'major' incident involving one or more of the following:

- a) potential or actual persistent effect on water quality or aquatic life;
- b) closure of potable water, industrial or agricultural abstraction necessary;
- c) extensive fish kill;
- d) excessive breaches of consent conditions;
- e) extensive remedial measures necessary;
- f) major effect on amenity value.

Category 2

A 'significant' pollution which involves one or more of the following:

- a) notification to abstracters necessary;
- b) significant fish kill;
- c) measurable effect on invertebrate life;
- d) water unfit for stock;
- e) bed of watercourse contaminated;
- f) amenity value to the public, owners or users reduced by odour or appearance.

Category 3

'Minor' suspected or probable pollution which, on investigation, proves unlikely to be capable of substantiation or to have no notable effect.

MAFF Definition of a serious incident

An incident that has any of the following effects and includes all cases where legal proceedings are initiated:

- a) downgrades the class of any water course classified in the River Quality Survey by more than 10% over 0.5 km;
- b) interferes with water abstraction through quantity and quality;
- c) results in fish mortality;
- d) causes significant interference with legitimate use of water, including stock watering;
- e) adversely affects any SSSI, nature reserve or area of high conservation interest.

APPENDIX B

Substantiated Farm Pollution Incidents in 1991

Incidents 1990	A	N	NW	ST	S	SW	T	W	WX	Y	TOTAL
Cows											
Slurry Stores/Waste Collection Tanks	5	18	99	109	20	108	8	132	68	24	591
Solid Stores	5	7	28	11	13	17	5	21	15	11	133
Yard Washing	10	5	82	35	4	236	5	84	7	19	487
Dairy/Parlour Washing	9	7	28	17	2	15	5	20	9	8	120
Land Run - off	11	4	47	58	22	50	7	23	43	41	306
Treatment System Failure	5	0	1	10	2	27	7	11	13	3	79
Silage	8	20	117	99	12	70	13	72	15	35	461
TOTAL CATTLE	53	61	402	339	75	523	50	363	170	141	2177
Pigs											
Slurry Stores	21	1	12	17	6	4	0	8	7	14	90
Yard Washing	18	1	7	3	0	4	2	2	0	8	45
Land Run - off	7	1	2	5	3	4	1	2	4	8	37
Treatment System Failure	9	0	0	3	0	3	1	0	0	3	19
TOTAL PIGS	55	3	21	28	9	15	4	12	11	33	191
Others											
Poultry	15	0	5	8	2	3	1	6	0	5	45
Sheep Dips	0	1	1	1	0	3	0	4	2	2	14
Pesticides	8	1	0	4	3	4	1	4	0	4	29
Mineral Fertiliser	7	0	1	1	1	2	1	5	0	2	20
Vegetable Washing	8	0	3	1	2	1	0	2	2	0	19
Oil Spillages	8	0	1	1	1	6	8	10	9	0	42
Fish Farms	0	0	0	18	0	5	0	2	4	5	36
Other	58	13	35	1	0	156	13	13	20	72	381
TOTAL OTHER	104	15	46	35	9	180	24	46	37	90	586
TOTAL FARM	212	79	469	402	93	718	78	421	218	264	2954

APPENDIX C

**Prosecutions relating to pollution incidents that occurred in 1990 irrespective of the date of hearing.
(P = Prosecutions; C = Convictions)**

NRA REGION	Farm		Industry		Oil		Sewage		Other		Total	
	P	C	P	C	P	C	P	C	P	C	P	C
Anglian	10	10	10	10	2	2	3	3	4	4	29	29
Northumbria	5	5	11	11	5	5	3	3	0	0	24	24
North West	50	47	50	45	8	7	4	2	0	0	112	101
Severn Trent	26	26	17	17	11	11	32	31	9	9	95	94
Southern	5	4	3	3	7	7	7	7	1	1	23	22
South West	40	36	12	12	2	1	12	9	5	5	71	63
Thames	4	4	14	13	22	19	13	9	2	2	55	47
Welsh	40	40	23	23	3	2	14	14	5	5	85	85
Wessex	14	13	4	4	1	0	8	5	0	0	27	22
Yorkshire	27	27	29	28	2	2	13	9	0	0	71	66
Total	221	212	173	166	63	56	109	92	26	26	592	553

There are no further prosecutions outstanding for pollution incidents that occurred in 1990.

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**IF YOU SEE DEAD AND DISTRESSED FISH OR
SUSPECT POLLUTION IN A RIVER - PLEASE
CONTACT YOUR REGIONAL NRA OFFICE
IMMEDIATELY**

NRA REGION	TELEPHONE NUMBER
ANGLIAN	0733 371811
NORTHUMBRIA	091 213 0266
NORTH WEST	0925 53999
SEVERN TRENT	021 711 2324
SOUTHERN	FREEPHONE 0800 252676
SOUTH WEST	FREEPHONE 0800 378500
THAMES	FREEPHONE 0800 252768
WELSH	0222 770088
WESSEX	LINKLINE 0345 078378
	(24 HR CHEAP RATE)
YORKSHIRE	0532 440191





NRA

National Rivers Authority